WinFrog Device Group:	**USBL**
Device Name/Model:	**Trimble T5600**
Device Manufacturer:	David Hadden Systems Manager Survey, Infrastructure, and Civil Engineering Trimble Navigation Ltd. 7403 Church Ranch Blvd. Westminster, CO 80021 USA Tel: (720) 887-6100 Fax: (720) 887-6101 EMAIL: david_hadden@trimble.com
Device Data String(s) Output to WinFrog:	Operator configured, see Device Description below
WinFrog Data String(s) Output to Device:	NONE
WinFrog Data Item(s) and their RAW record:	USBL HYDROPHONE NONE BEACON 309

DEVICE DESCRIPTION:

The Trimble T5600 total station device driver message specification is as follows:

The block format is as follows...
status<cr><lf>
data label=data<cr><lf>
...repeated as configured...
>

where:
status is

- 0=OK, measurement is valid
- 4=measurement is invalid
- 3,5,20,21,22,23,30 & 35 may appear but do not really apply data label is an integer value identifying the type of data in that record, such as the following that are to be decode by this driver
- 7= is horizontal angle in degrees, minutes and seconds with a decimal point separating the degress and the minutes (dd.mmss)
- 8= is the vertical angle in degrees, minutes and seconds where the degrees and minutes are separated by a decimal point (dd.mmss)
- 9= is the slope distance in metres

> is the default terminating character It is not followed by a <cr> and/or <lf>

*** Note 1: This Total Station Device does not output a target ID number. The value of 1 is hard coded into the WinFrog software.

*** Note 2: The Trimble T5600 Total Station must be set to output the defined data block as above.

DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Baud Rate: Configurable (300 to 57600), Default (9600), recommend use of 9600 or higher

Data Bits: 8

Stop Bits: 1

Parity: none

WINFROG I/O DEVICES > CONFIGURE DEVICE:

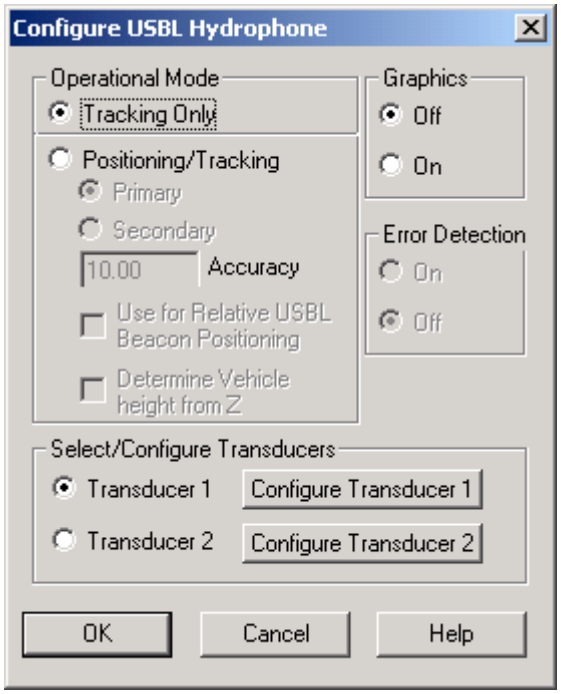
No configuration is required at the I/O Device window level.

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the TRIMBLE T5600 device creates two data items: USBL HYDROPHONE and BEACON. Once the data items have been added to the vehicle, they must be edited to suit the application. The USBL Hydrophone is added to the vehicle, which has the total station set up, while the Beacon is added to the vehicle in which the prism(s) are located.

Data item: USBL, TRIMBLE T5600, USBL HYDROPHONE

Highlight the HYDROPHONE data item in the vehicle's device list and click the Edit button to open the Configure USBL Hydrophone dialog box as seen below.



Operational Mode:
Set to **Tracking** for positioning or tracking of a structure/vessel relative to the Master Vessel. The Master Vessel (with the total station set up) would have to be positioned via GPS or other input and the prism(s) would have to be mounted on the structure vessel being positioned.

Set to **Positioning** and **Primary** if you want to position the Master Vessel relative to a stationary object. The Beacon (Prism) would therefore be located on the stationary object and the prism's position would have to be defined in a working transponder file. Refer to chapter 5 of the WinFrog User's Guide for more details on configuring transponder files. If Positioning/Tracking is selected, you can also specify Use for Relative USBL Beacon Positioning. This feature controls the use of the positioning of the hydrophone from a fixed prism for application to relative prism positioning. In this mode, the difference between the total station position, as determined directly from observation, to fixed prism is compared to the total station position determined from other positioning sources (e.g. DGPS). This difference is then applied to the position determined for any tracked prism. The concept is that any inherent errors due to local conditions, both environmental and mechanical, are cancelled out. This is independent of the Primary/Secondary setting.

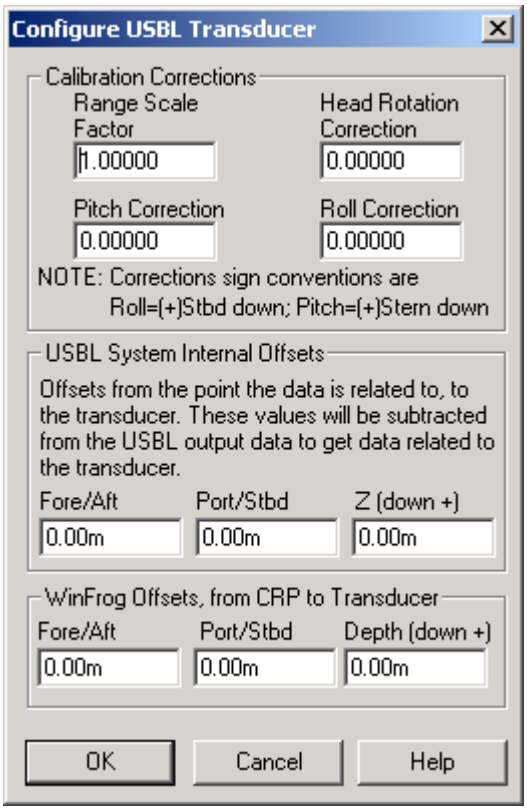
Determine Vehicle height from Z
This option does not apply to this device.

Graphics:
Turning on the Graphics will display the device name and a square at the location of the total station, within the Graphics and Bird's Eye windows.

Error Detection:
By enabling this option, error detection codes are included in the Raw Files. This option is mainly for post analysis and future development.

Select/Configure Transducers
For the sake of this device, the total station is considered to be the transducer. Two total station locations can be configured for use, however it is advised that only one be used at any given time.

Click either the Configure Transducer 1 or Configure Transducer 2 buttons to open the Configure USBL Transducer dialog box as seen below.

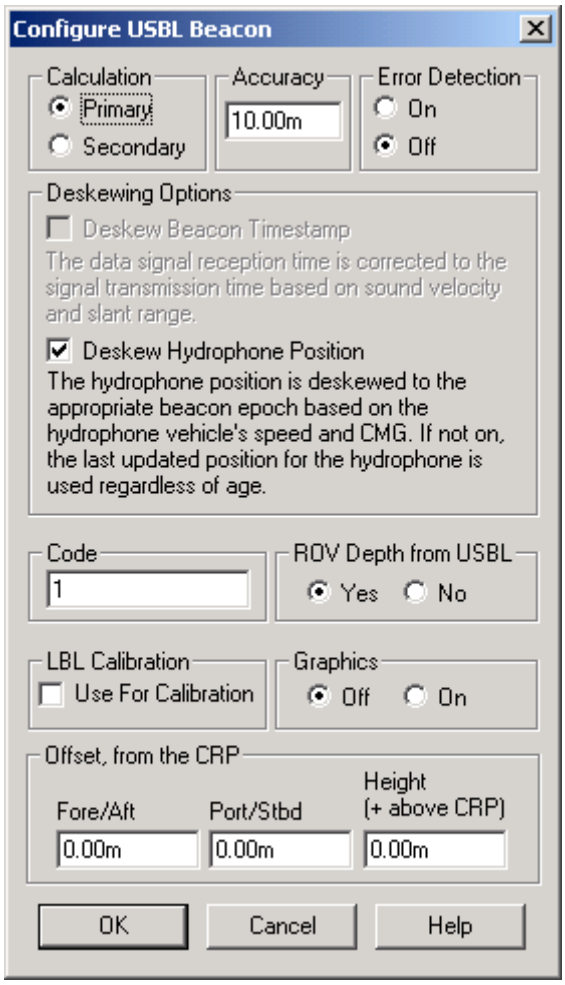


Calibration Corrections:
These values do not apply for total station operation. Set values as displayed above.

Offsets:
The offsets from the point the data is related to, to the transducer, are set to zero for total station operation. The **Winfrog Offsets, from CRP to Transducer** (Total Station) are set to similar values as would be applied to any device offset in WinFrog, i.e. from the CRP to the total station.

Data item: USBL, TRIMBLE T5600, BEACON

For the sake of this device, prisms are treated as beacons. In the vehicle's device list highlight the BEACON data item and click the Edit button to open the Configure USBL Beacon dialog box as seen below.



Calculation, Accuracy and Error Detection:
Set Calculation to Primary if the Prism is to be used for positioning, and assign a realistic accuracy. By setting Error Detection to 'On', errors are written to a file for post processing.

Deskew Hydrophone Position
When positioning the prism, WinFrog uses the last calculated position for the associated total station to determine the tracked prism's position. Depending on the vehicle's Kalman filter and Dead Reckoning settings, the position of the total station may be up to 1 second old. It is recommended that this deskewing option be enabled to remove positional inaccuracies associated with this latency.

Code:
If more than one target is being used, you can assign different point numbers to each in order to distinguish between them.

ROV Depth from USBL:
By setting this to Yes, the Prism height will be calculated.

LBL Calibration:
No calibration within WinFrog is required for operation of the total station.

Graphics:
By setting this option to on, a square and label will be displayed for the Prism location in the Graphics and Bird's Eye windows.

Offsets:
The Offsets are applied from CRP (of the structure/vessel) to the Prism Location. These values are set similar to values that would be applied to any device offset within WinFrog, i.e. from the CRP to the prism.

TELGRAM SPECIFICATION:

Refer to Device Description section above.